

ORAL HISTORY OF THE
TENNESSEE VALLEY AUTHORITY
INTERVIEWS WITH
JOHN WALTHALL

BY CHARLES W. CRAWFORD
TRANSCRIBER - BRENDA MEIER
ORAL HISTORY RESEARCH OFFICE
MEMPHIS STATE UNIVERSITY

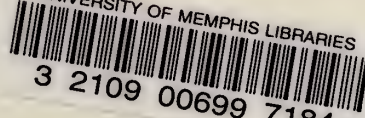


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INTERVIEW WITH JOHN WALTHALL

OCTOBER 5, 1970

BY CHARLES W. CRAWFORD

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PLACE Sheffield, Ala.

DATE October 5, 1970

John H. Walthall
(Interviewee) John H. Walthall

Charles W. Crawford
(For the Mississippi Valley Archives
of the John Willard Brister Library
of Memphis State University)

THIS IS THE ORAL HISTORY RESEARCH OFFICE OF MEMPHIS STATE UNIVERSITY. THIS PROJECT IS "AN ORAL HISTORY OF THE TENNESSEE VALLEY AUTHORITY." THE PLACE IS SHEFFIELD, ALABAMA. THE DATE IS OCTOBER 5, 1970, AND THE INTERVIEW IS WITH MR. JOHN H. WALTHALL, FORMERLY WITH THE TENNESSEE VALLEY AUTHORITY. THE INTERVIEW IS BY DR. CHARLES W. CRAWFORD, DIRECTOR OF THE MEMPHIS STATE UNIVERSITY ORAL HISTORY RESEARCH OFFICE, AND WAS TRANSCRIBED BY MRS. BRENDA P. MEIER.

CRAWFORD: Mr. Walthall, we can conduct this interview any way we like, but I would suggest that we start out, if you will, by giving a general summary of your background before you joined TVA, starting with where and when you were born, going through your education, preparation and experience before you joined the Authority.

WALTHALL: I was born in Roanoke, Virginia in October of 1900, and when I was still quite young we moved to Norfolk, Virginia. I went through grammar school and high school in Norfolk, and then I entered Massachusetts Institute of Technology in 1920.

CRAWFORD: Were you there, by any chance, when Van Court Hare was?

WALTHALL: I'm not sure about that. I didn't know him if he was. I graduated from MIT in 1924 and went to work for the Aluminum Company of America at their Badin, North Carolina plant. After being there for a couple of years I was sent to a little

town of Sabinanigo in the northern part of Spain to help finish up the construction and start up operation of an aluminum production plant. We stayed there roughly a year. One personal note: I was married on the first of June and sent to Spain on the fourth of June, with all expenses paid for me and my wife both.

When we returned from Spain we were in Maryville, Tennessee at the Alcoa plant.

CRAWFORD: What year was that, sir?

WALTHALL: That was . . . It's been a long time ago. That must have been about '28 or '29, and we stayed there for several years, until the bottom of the depression, at which time we left there and came with TVA. We came with TVA, I believe, in May of 1935. That covers this early history, I expect.

CRAWFORD: Fine. What was your training at Massachusetts Institute of Technology, Mr. Walthall? What did you study especially there?

WALTHALL: Well, my degree was in electrochemical engineering which embraced a good part of the electrical engineering course and a good part of a chemical engineering course taught there.

CRAWFORD: What did you do with Aluminum Company of America?

WALTHALL: Well, in the first years I was developing a new type of reduction cell for making aluminum known as the Soderberg Electrode Cell.

During the latter period I was in the operation of a hot-line consisting of about 100 of those aluminum-type furnaces.

CRAWFORD: Did you secure any patents, yourself, at this time?

WALTHALL: Yes, two or three. I don't remember just how many-- not very many.

CRAWFORD: Why were you transferred to the Maryville plant?

WALTHALL: Well, you see, I was sent to Spain to help start up a plant using this new type furnace and when that operation was completed, I was transferred to Maryville because while I was in Spain the aluminum company had installed 100 of this new type of furnace at the Maryville plant, and they needed somebody to start them up and operate them.

CRAWFORD: Do you know when the Aluminum Company of America's plant at Maryville was first established?

WALTHALL: No, I don't, but it was quite a few years before I went over there.

CRAWFORD: What size was the plant at the time you did go? I know it's been expanded since.

WALTHALL: Are you thinking in terms of hot-lines or . . .

CRAWFORD: What sort of production? What quantity production did they have then?

WALTHALL: Well, I would say about 100,000 pounds a day. It was not large as compared with present plants. And in addition, of course, to the hot line at Alcoa, they also had very large fabricating facilities.

CRAWFORD: Why was it not larger at that time? Did the quantity and cost of power have anything to do with it?

WALTHALL: When I said "not large" at that time, that was just because aluminum plants were not as large then as they are now. It was as large, so far as I know, as the other plants that the Aluminum Company had at that time. They had their own power-generating equipment, their own dams and so on, so that power, I think, was a reasonable price to them.

CRAWFORD: Production costs were low, then, weren't they?

WALTHALL: I would think they were about as low as they can ever

get. Everybody was working awful hard.

CRAWFORD: And you didn't close the plant at any time, then?

WALTHALL: The plant was not actually closed.

CRAWFORD: Was it 1935 that you went to TVA?

WALTHALL: Yes.

CRAWFORD: Why did you make the change, Mr. Walthall?

WALTHALL: Well, things were pretty gloomy over around Alcoa and there was no assurance that they wouldn't get worse. They had let a great number of people go, and I was just unhappy there under the circumstances. TVA was something new, and it looked like something new that was starting might be better than something old that was under very bad financial straits.

CRAWFORD: Yes, let's see what year was it you had gone to Maryville?

WALTHALL: I think it was '28.

CRAWFORD: How had you learned about TVA? Had you become acquainted with TVA personnel?

WALTHALL: I don't remember whether I had read about it or talked to people about it, or how I first became acquainted with TVA. Of course, everybody was reading everything about Roosevelt and his efforts to stint the depression, and TVA came along and there was great controversy about TVA, and it was just in the papers, so on and so forth. I don't believe, while I was at Alcoa, that I knew anybody in TVA.

CRAWFORD: What work did you expect to do starting with TVA?

WALTHALL: I was employed as an electrical engineer and the work that I expected to do was in the design of phosphorus furnaces and things of that kind. And it was a fortuitous circumstance as far as I was concerned because there was a mix-up when I arrived here, and I was put in a work for which I had not been employed. And from my own standpoint it turned out much better than it would have been otherwise.

CRAWFORD: Did you ever get to do any work in the design of phosphorus furnaces?

WALTHALL: Not directly, no.

CRAWFORD: What was the work that you were placed in with TVA?

WALTHALL: At that time TVA was starting a research and development

program on fertilizers and fertilizer products, and anything that used electricity. And when I showed up here after being employed, they had no record here of me having been employed, but they were quite anxious to get people in the research and development activities so they said, "Here's an engineer. He says he was employed as an electrical engineer, but he's had a lot of chemical experience, so we need somebody in research and development, so how about going to work in research and development? So I went over and went to work in research and development, and in a few weeks the man that I had been employed to work under started walking around saying "I wonder what ever happened to that fellow I was supposed to get," and they checked up and found out that I was the fellow. But by that time I had started in the other work and it looked like it would be an interesting type of work, and I had the option of either staying where I was or getting over into the design work, and I decided to stay where I was.

CRAWFORD: So you never did get back into the design directly?

WALTHALL: Not directly, no.

CRAWFORD: Who was in charge at Muscle Shoals at that time?

WALTHALL: Arthur Miller was in charge of all the activities.

CRAWFORD: Who was Personnel Manager or who worked with you when

you were recruiting at Knoxville?

WALTHALL: When I was employed?

CRAWFORD: Yes, sir.

WALTHALL: I don't remember who it was.

CRAWFORD: But you understood that you would be going to Sheffield?

WALTHALL: Yes, I never actually talked to anybody in Knoxville;
it was all by correspondence, and I was offered a job
at Sheffield so I knew that was where I was going to be.

CRAWFORD: When you started your research and development work
here at Sheffield, what work did you do first?

WALTHALL: Of course, there was a wide variety of activity going
on because they were trying to get some leads on what
projects might be worth pursuing further. Most of the initial
work I did was high temperature work on methods for making phosphate
rock usable as a fertilizer. A little later TVA got quite
interested in the possibility of using minerals from the Valley,
and one of the large mineral resources of the Valley is its high
aluminum clays, so we got started on projects for trying to make
aluminum from clay.

CRAWFORD: I believe you were the one who developed that process, weren't you, sir?

WALTHALL: Yes.

CRAWFORD: How did you find that? When did you discover it?

WALTHALL: Well, I don't know how it's possible to give the exact date, nor would I remember it, I suppose, if it was an exact date. It was one of those things that you start working on, and it was not a question of discovering that you could get aluminum from clay. Everybody knew that because the aluminum was in the clay, and if it was there, you could get it out. It was a question of developing methods that would get it out in a pure enough form and at a cost that would be reasonable. And, of course, there's no specific date on when a thing like that comes about. You just work on it and make improvements, and make improvements, and make improvements, all the time trying to make a pure product and trying to make a cheaper product.

CRAWFORD: Was it difficult to develop? Did you have to try a lot of things before you found what you wanted?

WALTHALL: We tried a great many things, and about that time, of course, World War II started coming along, and most of the alumina was brought in to this country from overseas or Central

America, and there was a great fear that submarines would sink all the ships and so on so that the project assumed considerable importance from the national defense standpoint.

The best answer I can give you, probably, as to the difficulties and magnitude of the undertaking, I expect, is that I think we spent probably a million dollars on the development. At one time, when things got real critical, we had sixty or seventy-five percent of the entire research and development staff working on some phase or other of this project.

CRAWFORD: When did you patent your process?

WALTHALL: Well, we had a half a dozen patents on it, and I don't remember the exact dates but surely it must have been in the late forties.

CRAWFORD: Do you suppose it would have been discovered if it had not been for World War II?

WALTHALL: Well, we were working on it before World War II, but not quite as intensively, and I personally was interested in it because, having worked in aluminum since I got out of school, I would have tried to encourage them to go ahead whether there had been a war or not. I don't know if I would have succeeded, but the war made it easier.

CRAWFORD: Was your process put into use in time to produce aluminum for World War II?

WALTHALL: It was ready but it never became necessary to use it, so it was not used.

CRAWFORD: Did that research and development in the process for aluminum take most of your time through the '30's and early '40's?

WALTHALL: Yes, I expect it did.

CRAWFORD: Did you work with Dr. Harry Curtis at any time?

WALTHALL: Well, Dr. Curtis, of course, was the guiding hand behind all of the research and development activities here before I came with TVA, and he left to go with the University of Missouri or Missouri State University. He was the one that employed me and he was quite active in all our affairs down here.

CRAWFORD: When was it that he came back to TVA? Was that in the fifties or late forties?

WALTHALL: Well, I don't remember all those dates; I would have to look up somewhere to find the actual dates because I just don't remember. It must have been in the fifties though.

CRAWFORD: I know that he was serving as Director during the fifties. What changes did World War II bring to your work besides the accelerated search for the aluminum process?

WALTHALL: Well, we did a considerable amount of work for the various branches of the armed services. Phosphorus, of course, is an important constituent of incendiary bombs, smoke screens, and things of that kind. And we were trying to help out in any way that we could, that we were called on to do for the military services.

CRAWFORD: Did the size of your staff increase in World War II?

WALTHALL: Yes, it went up considerably. Unfortunately, I think some of the fellows just came to work with TVA because they knew they could get deferments, or hoped they could.

CRAWFORD: They really did in case of necessary work, didn't they?

WALTHALL: Yes.

CRAWFORD: Did you make many significant discoveries during World War II in your research and development?

WALTHALL: Well, I could hardly say we didn't, could I? (Laughter)

CRAWFORD: I mean in addition to your aluminum process.

After the war ended, what was your research and development work mainly concerned with?

WALTHALL: Well, after the war ended, of course, our work went back primarily to methods of making better or cheaper or more effective fertilizers.

CRAWFORD: When you came to TVA, was the production mainly of nitrogenous fertilizer?

WALTHALL: It was entirely phosphate fertilizers. The plant was a nitrogen-producing plant and most people expected, when TVA was established, that the plant would produce nitrogen fertilizers. On the other hand, Dr. Morgan on the Board of Directors and Mr. McAmis in our Agricultural Division and Dr. Curtis, among others, were very influential in concentrating on phosphate fertilizers rather than nitrogen fertilizers because they were what the soils in this area in the Tennessee Valley needed. So it was quite a few years when almost all the work was on phosphorus fertilizers and not nitrogen fertilizers.

CRAWFORD: Mr. Walthall, what about the work you did in developing phosphate fertilizers--what changes did you take part in?

WALTHALL: Well, soon following the period that we have been talking

about, I was put in general charge of the engineering laboratory and the engineering work so that my activities were not as specifically related to any one project like they were on the aluminum project. It was the general supervision of the various high temperature processes that were being studied to try to make phosphate fertilizers. Phosphate rock is an unusual mineral in that it has fluorine in it, and the fluorine ties up the phosphate so that the growing plant cannot use the phosphate.

All you have to do is get the fluorine out and then the rock is usable as fertilizer, but that is not as simple as it sounds. If you heat the rock hot enough, you can drive the fluorine off and then the rock becomes available. And a great deal of the work during that period was in methods trying to find economical ways of eliminating the fluorine from phosphate rock so that the phosphate rock could be used in the fertilizer. That was one of the main studies going on.

There were also a lot of problems in concentrating the rock. When you dig it out of the ground, it might have only 15% plant food, and you wanted a fertilizer that contained 45% plant food, so there were a lot of problems in connection with concentrating it 15 to 45%.

CRAWFORD: Why did you particularly want to concentrate it? Was it because of the bulk and the shipping difficulty?

WALTHALL: The shipping cost. If it's 45%, you don't have to

spread around but one-third as much as if it's 15%. Every activity was directed towards trying to get a fertilizer on the soil at the lowest possible cost. Concentration was one method of accomplishing that.

CRAWFORD: What did you do to concentrate this fertilizer?

WALTHALL: It was a method of separating by mechanical means rather than chemical, the clay and the silica and things of that kind that were mined when you dug up the rock.

CRAWFORD: How did you change them by chemical means?

WALTHALL: After you got rid of the unwanted silica and clay, you then had a pure phosphate rock which was still not available to the growing plant. You could make it into a fertilizer either by several methods or by treating it with acids of various kinds. You could also take the phosphate rock and completely break it down in the electric furnace to elemental phosphorus and then burn the phosphorus and add water to it to make phosphoric acid, and then treat some more rock with the phosphoric acid.

In other words, what it amounted to--you took the phosphate all to pieces just to get rid of the fluorine; then you had to put it all back together again, with the exception of the fluorine, in order to make a fertilizer.

CRAWFORD: Could you do that economically?

WALTHALL: Not directly. We made a very high-grade fertilizer that way, but during most of that period it was cheaper to make it by treating the rock with sulfuric acid rather than through the electric furnace process. And I'm just afraid that these increased power rates that we've been hearing about are going to make it still more difficult to go by any electrical process.

CRAWFORD: Do you think that the chemical process will become more important?

WALTHALL: There is always a race between the electrical process and the chemical process. The chemical process requires sulfur and the price of sulfur has been rather volatile over the years, and every time the price of sulfur goes up a dollar or two a ton, the electrical process looks better. And then the electrical process goes up a mil or two a kilowatt hour, and then you're back to the sulfur process, and it's back and forth.

At one time a great many people in our research and development activities thought that electricity from atomic energy was going to cost practically nothing, and therefore the electrical process would be better than anything else. Recently I have just casually discussed the matter with some of the present people, and they are working mighty hard on the sulfuric acid process now.

The electric furnace process has some advantages over the acid process. It makes elemental phosphorus, which is needed

in times of national emergencies for defense purposes. Most of our phosphorus, during the war years and during the Korean crisis, went into national defense, so it was good we had that facility here for that purpose. If you wanted to ship the product a tremendous distance, like for instance to some under-developed country in Africa--if you shipped phosphorus you would be shipping a product which, by the arbitrary method of calculation, would have 225% plant food value, whereas the ordinary, standard super-phosphate just has 48% plant food value. So there are a lot of factors one way and the other.

CRAWFORD: Do you suppose that the enrichment process can be continued?

WALTHALL: Well, you can't get much higher, as far as phosphorus is concerned, than 225%, can you? (Laughter) It won't go any higher than that, no.

CRAWFORD: Did these production processes increase the amount of fertilizer used in the Valley?

WALTHALL: Well, the processes plus the educational programs that we carried on certainly tremendously increased the use of phosphate fertilizers in the Valley. We, here, carried out the chemical processes and McAmis and his group carried out a great many demonstrations and educational programs. And between the two of them, fertilizer use not only increased in the Valley, but all

over the country.

CRAWFORD: Were you able to produce it quickly enough to supply this need?

WALTHALL: I think we were able to produce it as it was needed.

You see, we did not try to produce all the material that was needed. We merely tried to produce enough to encourage people to use it so they would ask for it from their dealers and then private industry would be encouraged to take up the processes and go ahead with it.

They have already been told that private industry shows a tremendous interest in all of the work here and they have taken up a great many of our processes. Our patents have been used by, I don't know, 300 different companies or something of that kind.

CRAWFORD: Are all the TVA patents open for private use?

WALTHALL: All of ours certainly are, and I think we, here, are 98% of them because that was our work--research and development. I don't recall off hand any that were not open to unrestricted use.

CRAWFORD: Do you believe this increased use of phosphate fertilizers had an effect on the region? Did you notice a change in the TVA area after they started?

WALTHALL: I think it had a tremendous effect because the land in the valley was getting pretty well worn out. People would use nitrogen fertilizers because they could get an immediate response from them. They didn't realize that the greater that response was, the more minerals they were taking out of the soil. And the result was that the soil was getting very depleted in phosphorus and potassium through the large scale use of nitrogen. Something had to come along and convince everybody that you not only had to use nitrogen, but you had to use the minerals that were being taken out of the soil or the soil would soon not be any good.

CRAWFORD: It had originally been very rich soil, hadn't it--much of it at any rate?

WALTHALL: I think so.

CRAWFORD: What other work did you do in your research besides the aluminum and the fertilizer research?

WALTHALL: Of course, we did a great deal of work for the military services, especially in the Korean incident and at the time when our relations with Russia were not very good, and of course, during World War II.

CRAWFORD: Did you do that for the army, navy, or for all the services?

WALTHALL: Well, most of it was for the army; some of it was for the navy, and I don't think we did anything for the air force.

CRAWFORD: Was it concerned with chemical development?

WALTHALL: Chemical development that was generally, one way or the other, connected with phosphorus. Phosphorus is a very versatile material. You can use it to grow more food, to raise more people, so you can use the phosphorus to kill them with.

CRAWFORD: Can you discuss any part of the military research that you did?

WALTHALL: Well, I think it's been declassified now. Our biggest work, of course, was with this nerve gas that you have probably read a lot about in the newspapers lately.

CRAWFORD: Yes, apparently it's easier to make than to get rid of.

WALTHALL: Yes. There is a plant, of course, adjacent to our fertilizer plant that was built by the War Department, approximately a fifty million dollar plant, to carry the process half-way through. And then the product from that plant was shipped to Colorado to be made into the final product; that is, a product containing phosphorus. It was something brand new. It was known

that the Germans had worked on such a process and when the war ended, the Russians picked up the Germans who had worked on the process and the plants that the Germans had built, and moved them lock, stock, and barrel to Russia. So it was up to the United States to take some defensive action, and they tried to develop a process in a very short time making this nerve gas.

CRAWFORD: Did you have a large enough staff to take this work up and to continue your other research also?

WALTHALL: No, we enlarged the staff, but at times I think three-quarters of our staff was connected in one way or another with national defense activities.

CRAWFORD: And that declined after the Korean War again, I suppose.

WALTHALL: Yes.

CRAWFORD: What was your main sort of research after the Korean War?

WALTHALL: Well, we had pretty well covered the pure phosphate fertilizers and we then got into combination fertilizers; that is, fertilizers containing both nitrogen and phosphorus. We also got into other forms of fertilizers. Up until that time most all of the fertilizers had been in the solid state--solids. We did

a great deal of work on liquid fertilizers, and it turned out very well and is very widely used.

By combining nitrogen and phosphorus in various forms of fertilizer, we could make a still higher analysis material and also, as a result of World War II, we had built here a modern synthetic nitrogen plant to make explosives. The material was fine for explosives but was very unsatisfactory for fertilizers from a physical standpoint. So we did a great deal of work after the war trying to make this material in a better form, purely a mechanical form for fertilizer use. That work turned out rather well too.

CRAWFORD: That process has been taken by private fertilizer manufacturers now, hasn't it?

WALTHALL: Yes.

CRAWFORD: What year did you leave TVA, Mr. Walthall?

WALTHALL: I left in 1965.

CRAWFORD: What was the state of research then? What was going on in research and development at '65?

WALTHALL: Well, there's always the attempt to make higher and higher analysis fertilizers. There's also a problem that when you put a fertilizer in the soil, it reacts with other

constituents of the soil and gets tied up in unavailable forms so that the growing plant only gets a relatively small amount of the value that's in the fertilizer, so a lot of work has been done on trying to make fertilizers that do not become unavailable. Another problem is, particularly with the nitrogen fertilizers which, by and large, are quite soluble that they'll leach out of the soil, and by the time the plant gets around to needing them, why a lot of it may be gone. So it would be nice to have a fertilizer that dissolves slowly, just as the plant needed it instead of dissolving rapidly and being leached away. Work of that kind was going on--is still going on, I think.

CRAWFORD: Who made the decisions about what research project you would work on?

WALTHALL: Well, it's a fairly long, drawn out process. Various research project leaders would have ideas about what would be a good project. They would propose that project to the head of their group and try to make some estimate of the cost and the time that it would take to do it. The head of their group would then pass on whether or not he thought it was a promising project and he would either reject them or adopt them, and then it would go to the head of the division, and he'd study it and trim it some more, and then we would get all the projects together to comprise a budget for that year and then it would go to the TVA General Manager and then to the Board of Directors, and then it would all

be submitted to the Bureau of the Budget and we would have to go up there and explain what we wanted to do and why we wanted to do it, and what we thought the results would be; and then it would go to Congress. Eventually, if we were lucky, we would get approval and the money to go ahead and carry out some work.

CRAWFORD: Did you ever have major projects that you wanted to undertake you were unable to get approved?

WALTHALL: I don't think so. We tried to screen them, and if we could convince Dr. Curtis and our Board that they were good, why we never had any trouble from then on. I would say, if we could convince Dr. Curtis and our General Manager, before they ever got to the Board.

CRAWFORD: And, of course, later Dr. Curtis was on the Board.

WALTHALL: Later he was on the Board.

CRAWFORD: Well, generally your experiments were successful, weren't they?

WALTHALL: I couldn't say what percentage of them were successful because I never made such a calculation, but at least enough of them were successful that we were able to convince people that we had a good program, and they continued to support it.

As you well know, in any research you try many things and a lot of them don't work out. A few of them do, and if you can come up with one good one every so often, why you are doing as well as can be expected.

CRAWFORD: Did you ever have useful suggestions about what things to search for from outside the research group?

WALTHALL: We tried to get suggestions. On two or three occasions at say ten-year intervals, we would hire eight or ten of what we thought were the outstanding chemists or chemical engineers on a consulting basis to meet with us once or twice and go over all of our programs and discuss with them what we were doing, and see if we could get some suggestions and so on. We certainly got some help from those people but we had so many people working in those fields, so intensively that our people just knew more about those fields than anybody outside, so we didn't get too much out of them, I don't think.

CRAWFORD: I suppose that's often true. You get people who are such specialists in what they are doing.

WALTHALL: Yes.

CRAWFORD: Whose idea was that--to establish a consulting board?

WALTHALL: I'm not sure just whether it was an individual's idea or what, but we always had to defend our program and, as you know, there are times in the budgeting process when money gets scarce, and this is one of them right now, I think.

CRAWFORD: Yes.

WALTHALL: And when it begins to get scarce and you have to cut back on programs, then you would like to have some help on deciding which ones you ought to cut back on and which ones look promising, and so on, so that when we got into those periods, why we would try to get some outside help. I don't know just who thought of the committees but once somebody suggested it, most everybody was enthusiastic about it and there was no problem selling our Board on the idea of hiring these people and so on.

CRAWFORD: I believe they generally approved this sort of thing-- outside consultation.

Did you have to travel often to the Bureau of the Budget, to Congress, to Knoxville, in your work?

WALTHALL: Well, from my standpoint, unfortunately, the better position you get in TVA, the more you have to travel. In the beginning years, of course, I didn't travel at all. In the later years I had to travel more than I wanted to travel. I don't like to travel; that is, except on something like that, but in the

later years we would have to go to the Bureau of the Budget once or twice and then to, perhaps, one of the congressional hearings, generally the House hearing. The Senate hearing didn't require much direct testimony from down here, but there were numerous trips to Knoxville, of course.

CRAWFORD: You traveled by train, I suppose, at first, didn't you?

WALTHALL: Yes, we used to go by train all the time and that was a miserable trip because you left here close to midnight and you got to Knoxville at five or six o'clock in the morning, and things like that. And then when you left Knoxville to come back you'd get back here about 2:30 in the morning or 3:00 in the morning, and it was not a very pleasant way to go back and forth.

CRAWFORD: Did the directors come here often?

WALTHALL: Dr. Curtis used to come down fairly often, but the directors, as a group, would hold a meeting here once or maybe twice a year. Other than that, when they were accompanying some important visitor, they would not generally come here.

CRAWFORD: You did have visitors touring the facilities, I believe, didn't you?

WALTHALL: We had visitors, yes, and the number grew quite large,

and still is. Every several years, when we thought we had developed enough new things to warrant it, we would put on an open house for two or three days to demonstrate the new methods and all. Practically every good size fertilizer company in the United States and many from throughout the world would come to attend those meetings. I think we had upwards of 400 representatives from industry at those meetings, and maybe 25 of them would be from other countries, and the rest from the United States.

CRAWFORD: Did you generally have good relations with private industry?

WALTHALL: Not in the beginning. Private industry was suspicious, and I can understand why, of the government being in business in what they thought was competition to them. As the years went on, however, and in particular as our Board of Directors adopted a policy that as soon as we got a process working real well on a full-plat scale and had distributed a lot of the products around to get farmers interested in it, that we should then curtail the production of that material. And following that policy, we just discontinued making super phosphates, and I think, by now, they are completely out of the ammonium nitrate. They had curtailed it a great deal by the time I left.

Industry gradually began to understand that we were going to develop something and carry it on for a few years and then get out of that business, and if they wanted to go ahead with it,

why there it was. In recent years some of the large fertilizer companies have actually ceased carrying on fertilizer research on the grounds that, "What's the use? TVA is doing it and they have a bigger staff and are more knowledgeable in their field than we can be, so we will just go down and talk to them."

CRAWFORD: So your relations with private industry did get much better, didn't they?

WALTHALL: A lot better. Another thing that I think helped a great deal. TVA was never reluctant to see one of its men leave here and take a job with private industry. It caused us to have a bigger turnover than we normally would have. On the other hand, we've got so many people out in private industry that used to work here that they are all friends now.

CRAWFORD: And they are loyal to TVA, I suppose? I've noticed that about people who have worked for TVA.

WALTHALL: I was asking about a young fellow the other night. I happened to run into the superintendent of the Union Carbide Company down here. I asked him what had ever happened to that young fellow, and he said, "Why, he's vice president of our company now."

CRAWFORD: Were you ever tempted to leave TVA yourself?

WALTHALL: Well, I thought about it, but it was a rather interesting kind of work here and I lived here a long time. My first wife had died here and I had remarried a local girl, and there were just a lot of factors that tended to keep me here.

CRAWFORD: Well, you certainly did spend some time with TVA-- thirty years, wasn't it, Mr. Walthall?

WALTHALL: Yes.

CRAWFORD: What was the most rewarding part of that work to you personally?

WALTHALL: I suppose the work on alumina was the most satisfactory, even though the process has not been used. At least it's always available in case an emergency comes up.

What happened was that a great many additional deposits of bauxite were discovered in Central America, particularly in Jamaica and places like that, and as long as you can get high grade bauxite, then the process of making aluminum from clay cannot compete with it.

CRAWFORD: What is the extent of the aluminum-bearing clay deposits? I suppose the country has a great deal.

WALTHALL: I don't know the total extent. At the time we were so

interested in it, we asked our Geology Division to find us at least five million tons in the Valley to ensure that if things worked out and the process was needed, that there would be enough ore to warrant going ahead with the process. They found five million tons in central Tennessee without any particular trouble, and when they had found those five million, they quit. How much more, I don't know.

CRAWFORD: Did you find adequate supplies of phosphate in the Valley area or did you have to search outside?

WALTHALL: There are adequate deposits of fertilizer in the Tennessee Valley, but they are not of as high a grade as those that are in Florida, so that we have used a great deal of Tennessee's and we also have used a great deal of the Florida deposits.

CRAWFORD: Where else in the country are the major locations of phosphate?

WALTHALL: Besides Tennessee and Florida?

CRAWFORD: Yes.

WALTHALL: There has been, in recent years, quite a bit of phosphate found in the eastern part of North Carolina, and I don't know where else. Oh, I overlooked mentioning one of the largest

deposits in the whole country, and that is out in the Rocky Mountains.

CRAWFORD: Does the supply seem adequate for a long period ahead?

WALTHALL: Well, the last I heard, it was thought there was enough for about two thousand years.

Phosphate will not be the controlling thing; potash is maybe two hundred years--phosphate, two thousand; and nitrogen is 80% of the atmosphere.

CRAWFORD: Mr. Walthall, I want to thank you very much for your contribution to this study.

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